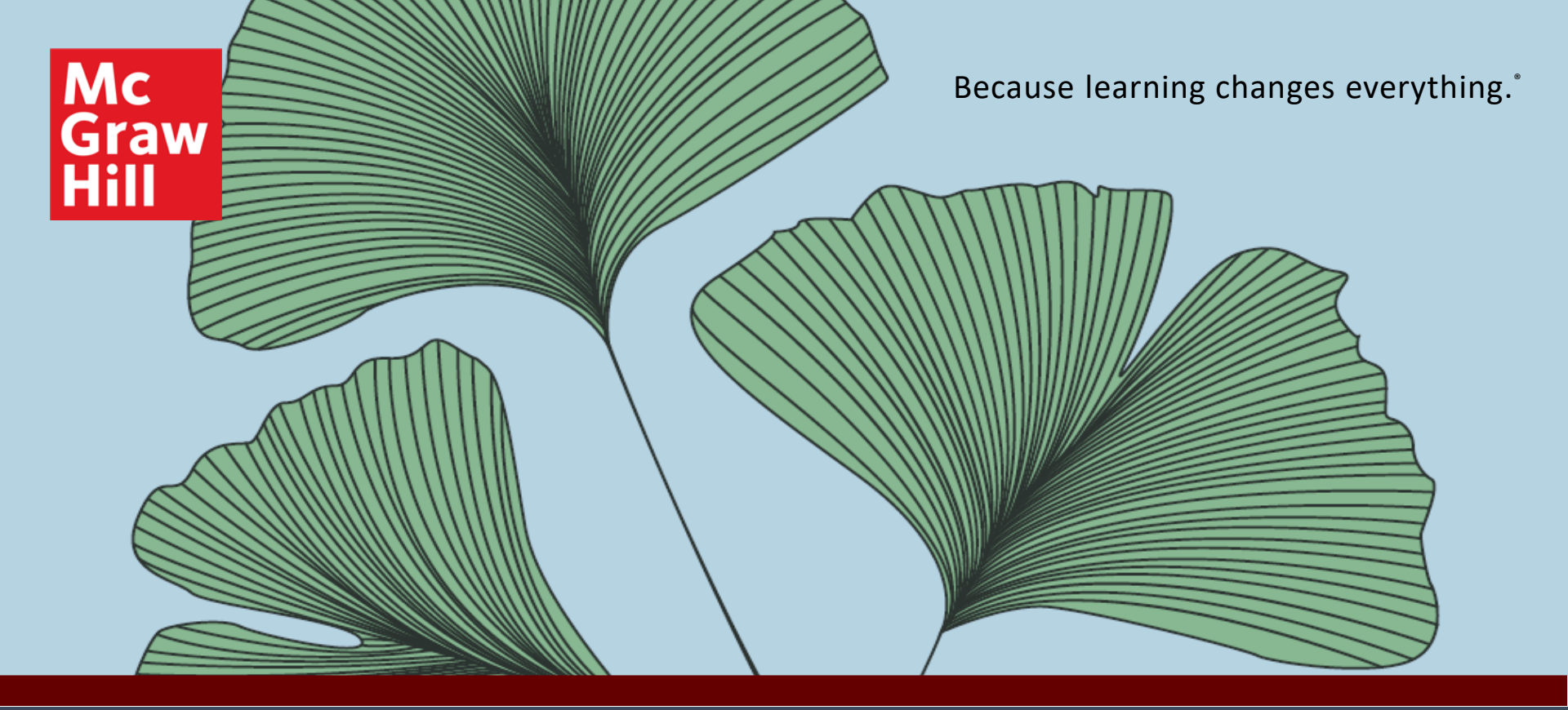
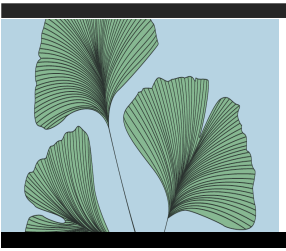


Chapter 10

Stabilizing the Economy: The Role of the Fed

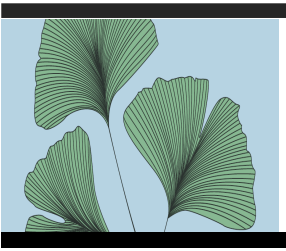
Copyright 2022 © McGraw Hill LLC. All rights reserved. No reproduction or distribution without the prior written consent of McGraw Hill LLC.



Learning Objectives

1. Show how the demand for money and the supply of money interact to determine the equilibrium nominal interest rate.
2. Explain how the Fed uses its ability to affect the money supply to influence nominal and real interest rates.
3. Discuss how the Fed uses its ability to affect bank reserves and the reserve-deposit ratio to affect the money supply.
4. Describe the additional monetary policy tools that the Fed can use when interest rates hit the zero lower bound.
5. Explain how changes in real interest rates affect aggregate expenditure and how the Fed uses changes in the real interest rate to fight a recession or inflation.
6. Discuss the extent to which monetary policymaking is an art or science.

© McGraw Hill LLC



Fed Watch

Analysts attempt to forecast Fed decisions about monetary policy.

- Greenspan briefcase indicator.
- Fed decisions have significant effects on financial markets and the macro economy.

Monetary policy is a major stabilization tool.

- Quickly decided and implemented.
- More flexible and responsive than fiscal policy.

© McGraw Hill LLC

The Fed and Interest Rates

Controlling the money supply is the primary task of the FOMC.

- Money supply and demand determine the interest rate.
- Fed manipulates supply to achieve its desired interest rate.

Portfolio allocation decisions allocate a person's wealth among alternative forms.

- Diversification is owning a variety of different assets to manage risk.

The **demand for money** is the amount of wealth held in the form of money.

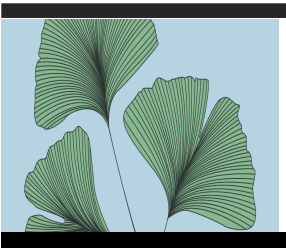
© McGraw Hill LLC

Demand for Money 1

Demand for money is sometimes called an **individual's liquidity preference**.

- The Cost-Benefit Principle indicates people will balance the marginal cost of holding money versus the marginal benefit.
  - Money's benefit is the ability to make transactions.
- Quantity of money demanded increases with income.
- Technologies such as online banking and ATMs have reduced the demand for money.
  - M1 has decreased from 26% of GDP in 1960 to 18% in 2017.

© McGraw Hill LLC



Demand for Money 2

The marginal cost of holding money is the interest foregone.

- Most forms of money pay little or no interest.
  - Assume the nominal interest rate on money is 0.
  - Alternative assets such as stocks or bonds have a positive nominal interest rate.

The higher the nominal interest rate, the smaller the quantity of money demanded.

Business demand for money is similar to individuals'.

- Businesses hold more than half of the money stock.

© McGraw Hill LLC

Macroeconomic Factors that Affect the Demand for Money

Demand for money depends on:

- Nominal interest rate (*i*).
  - The higher the interest rate, the lower the quantity of money demanded.
- Real income or output (*Y*).
  - The higher the level of income, the greater the quantity of money demanded.
- The price level (*P*).
  - The higher the price level, the greater the quantity of money demanded.

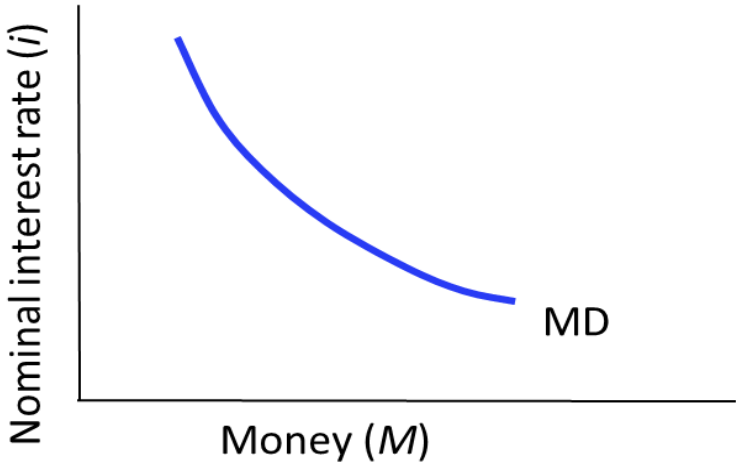
© McGraw Hill LLC

The Money Demand Curve 1

Interaction of the aggregate demand for money and the supply of money determines the nominal interest rate.

The **money demand curve** shows the relationship between the aggregate quantity of money demanded, *M*, and the nominal interest rate.

- An increase in the nominal interest rate increases the opportunity cost of holding money.
  - Negative slope.



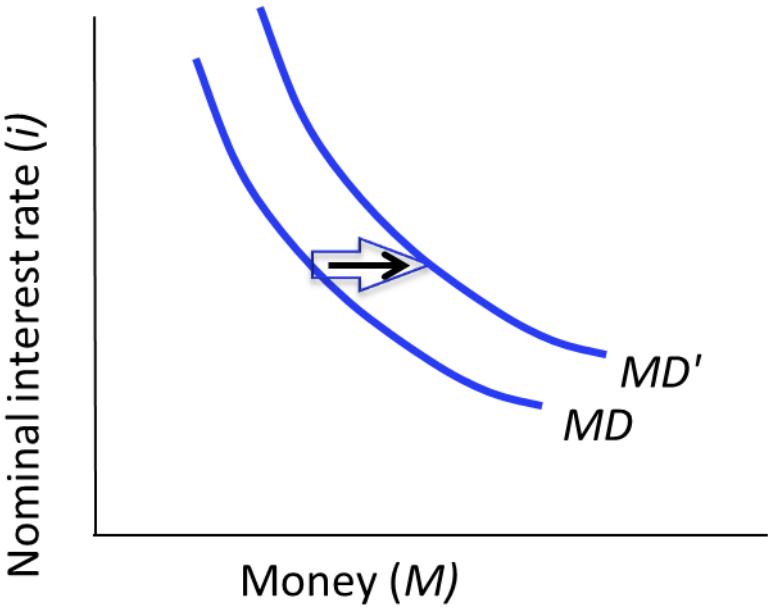
© McGraw Hill LLC

The Money Demand Curve 2

Changes in factors other than the nominal interest rate cause a shift in the money demand curve.

A change in demand for money can result from anything that affects the cost or benefit of holding money.

- An increase in output.
- Higher price levels.
- Technological advances.
- Financial advances.
- Foreign demand for dollars.



© McGraw Hill LLC

Demand for Dollars in Argentina

The average Argentine holds more U.S. dollars than the average U.S. citizen.

In the 1970s and 1980s, Argentina had high rates of inflation.

- Real returns on assets in pesos declined.
- Argentines switched to dollars as a store of value.

In 1990, the U.S. dollar and Argentine peso traded 1:1.

- Both were accepted for transactions.

By 2001, inflation in Argentina caused the system to break down.

- Peso was worth less than the dollar.

© McGraw Hill LLC

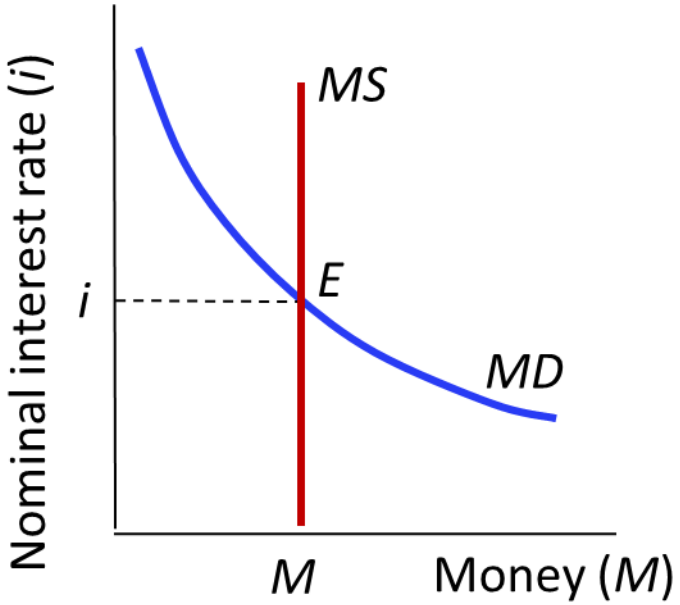
Supply of Money

The Fed primarily controls the supply of money with open-market operations.

- An open-market purchase of bonds by the Fed increases the money supply.
- An open-market sale of bonds by the Fed decreases the money supply.

Supply of money is vertical.

Equilibrium is at *E*.



Access the text alternative for slide images.

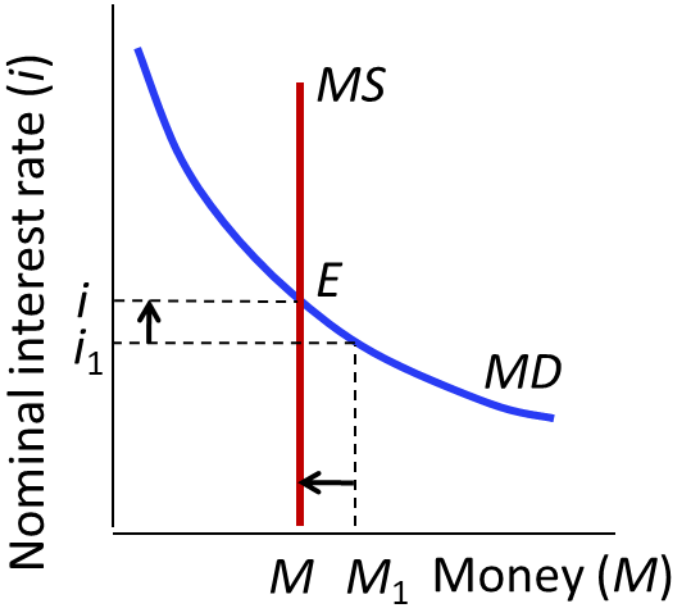
© McGraw Hill LLC

Equilibrium in the Money Market

Bond prices are inversely related to the interest rate.

Suppose the interest rate is at i_1, below equilibrium.

- Quantity of money demanded is M_1, more than the money available.
- To get more money, people sell bonds.
  - Bond prices go down, interest rates rise.
- Quantity of money demanded decreases from M_1 to M.



© McGraw Hill LLC

How the Fed Controls the Nominal Interest Rate 1

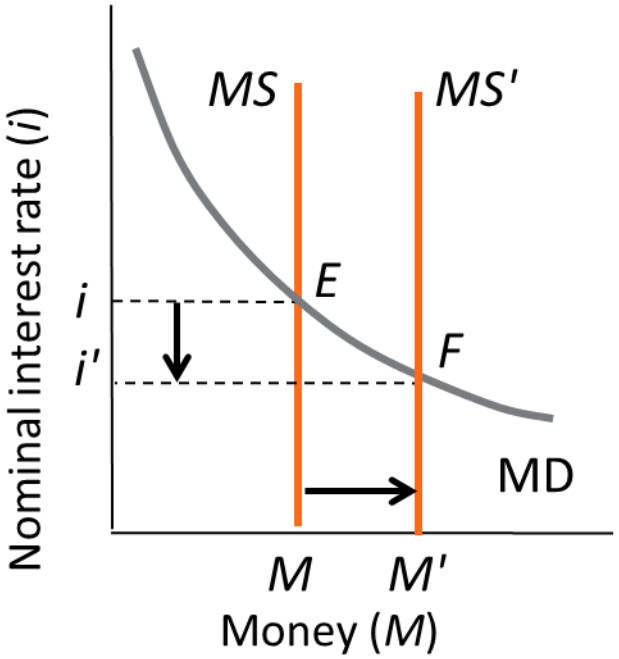
Fed policy is stated in terms of target interest rates.

- The tool they use is the supply of money.

Initial equilibrium at *E.*

Fed increases the money supply to *MS'*.

- New equilibrium at *F.*
- Interest rated decrease to *i'* to convince the market to hold the new, larger amount of money.

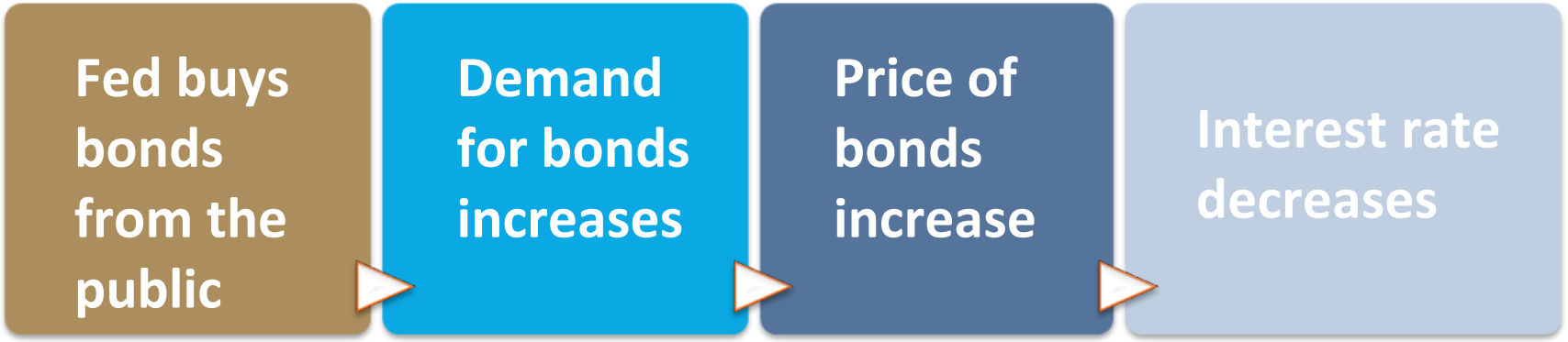


© McGraw Hill LLC

How the Fed Controls the Nominal Interest Rate 2

To Decrease the Money Supply

To Increase the Money Supply



© McGraw Hill LLC

The Fed Targets the Interest Rate

The Fed cannot set the interest rate and the money supply independently.

Fed policy is announced in terms of interest rates because.

- Public is not familiar with the size of the money supply.
- Main effects of monetary policy on the economy work through interest rates.
- Interest rates are easier to monitor than the money supply.

© McGraw Hill LLC

The Role of the Federal Funds Rate

The **federal funds rate** is the rate commercial banks charge each other on short-term (usually overnight) loans.

- Banks borrow from each other if they have insufficient funds.
- Market determined rate.
- Targeted by the Fed.

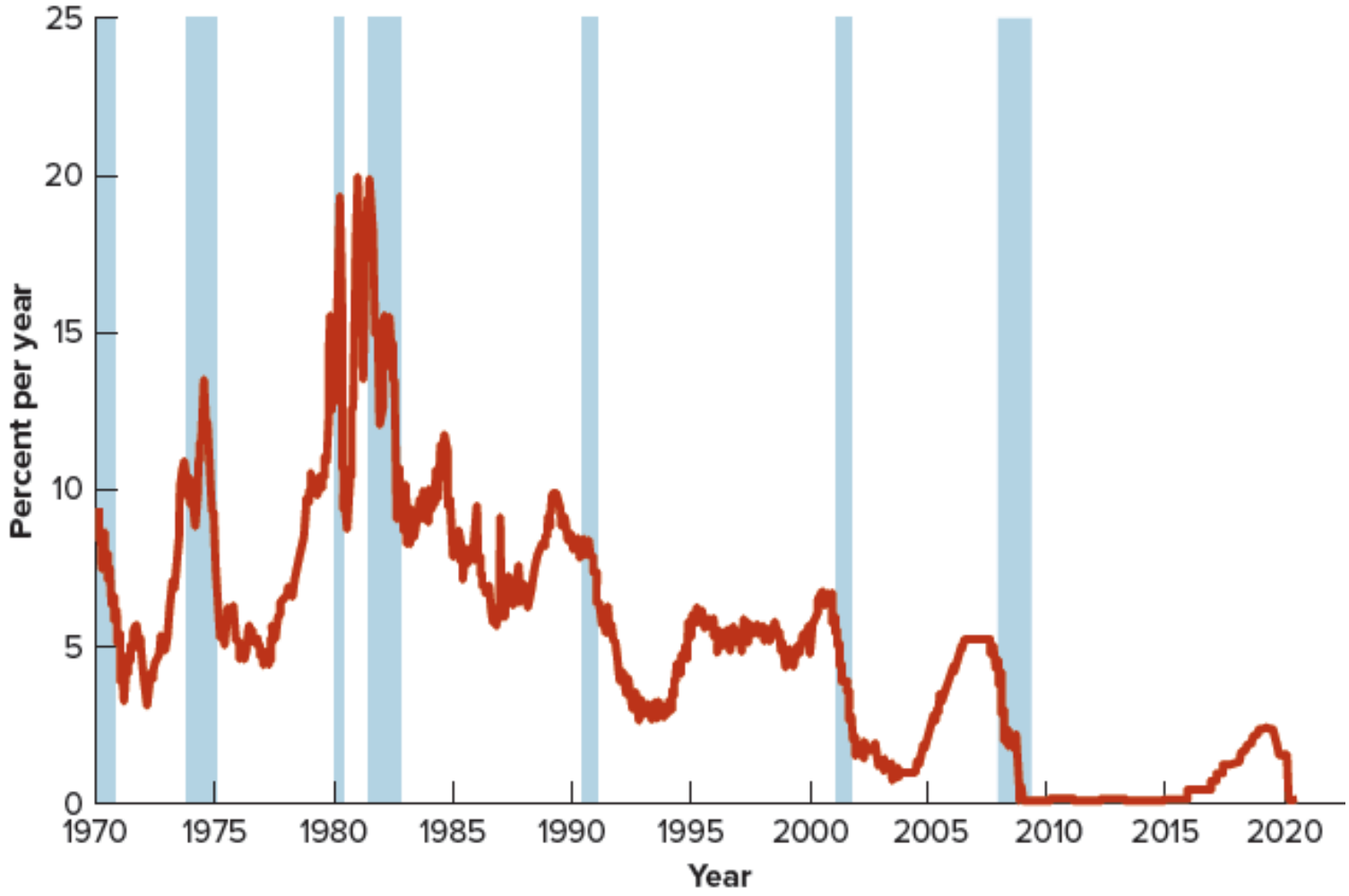
To decrease the federal funds rate the Fed conducts open market purchases.

- Reserves increase.

Interest rates tend to move together.

© McGraw Hill LLC

The Federal Funds Rate, 1970-2020



Access the text alternative for slide images.

© McGraw Hill LLC

Can The Fed Control the Real Interest Rate?

Fed controls the money supply to control the nominal interest rate, *i*.

- Investment and saving decisions are based on the real interest rate, *r*.
  - Fed has some control over the real interest rate

$$r = i - \pi$$

where π is the rate of inflation.

The Fed has good control over *i*.

Inflation changes relatively slowly.

- Changes in nominal rates become changes in real rates.

© McGraw Hill LLC

Additional Controls over the Money Supply 1

Open-market operations are the main tool of money supply.

Fed offers lending facility to banks, called **discount window lending**.

- If a bank needs reserves, it can borrow from the Fed at the discount rate.
  - The **discount rate** is the rate the Fed charges banks to borrow reserves.

Lending increases reserves and ultimately increases the money supply.

Changes in the discount rate signal tightening or loosening of the money supply.

© McGraw Hill LLC

Additional Controls over the Money Supply 2

Money supply is determined by three things:

$$\text{Money Supply} = \text{Public Currency} + \frac{\text{Bank Reserves}}{\text{Reserve-Deposit Ratio}}$$

The Fed can affect the money supply by affecting any of these three things:

- Currency held by the public.
- Bank reserves.
- The desired reserve-deposit ratio.

Open-market operations can affect banking reserves.

© McGraw Hill LLC

Additional Controls over the Money Supply 3

The Fed can also change the reserve requirement for banks.

- The **reserve requirement** is the minimum values of the ratio of bank deposits that must be held in reserves.
- The reserve requirement is rarely changed.

Bank reserves can also be affected by **discount window lending**.

- Banks short on reserves can borrow from the discount window.
- The **discount rate** on these loans is set by the Fed.

© McGraw Hill LLC

Excess Reserves: The Norm since 2008

Reserve requirements do not prevent banks from maintaining reserve-deposit ratios that are well above that minimum level.

- **Excess reserves:** Bank reserves in excess of the reserve requirements set by the central bank.
- As a result, the money supply may not change even if the fed changes the supply of reserves.

Excess reserves peaked in 2014 at more than $2.5 trillion, 15 percent of GDP.

By late 2019 excess reserves were $1.3 trillion and shot up again in response to the COVID-19 economic fallout.

© McGraw Hill LLC

Do Interest Rates Always Move Together?

- **Zero lower bound:** a level, close to zero, below which the Fed cannot further reduce short-term interest rates.
- Can't go far below zero – would you pay someone to lend them money?
- The Fed has some tools it can use in this case.

© McGraw Hill LLC

Additional Controls over the Money Supply 4

Quantitative Easing (QE): The Fed buys financial assets, lowering the yield or return of those assets while increasing the money supply.

- Used to stimulate the economy by purchasing assets of longer maturity thereby lowering longer-term interest rates.
- Fed has purchased trillions worth of assets since 2008.

Forward Guidance: The Fed gives indications of its future policies so that markets will react.

Interest on Reserves: Even at an interest rate of zero, the Fed can offer interest on its reserves to give banks a reason to keep money at the Fed.

© McGraw Hill LLC

Aggregate Expenditure and Real Interest Rate

Aggregate expenditure has components that are affected by *r.*

- Saving decisions of households.
  - More saving at higher real interest rates.
  - Higher saving means less consumption.
- Investment by firms.
  - Higher interest rates mean less investment.
    - Investments are made if the cost of borrowing is less than the return on the investment.

Both consumption spending and investment decrease when the interest rate increases.

© McGraw Hill LLC

Interest in the Keynesian Model – An Example

Components of aggregate spending are

$$C = 640 + 0.8\,(Y - T) - 400r$$

$$I = 250 - 600r$$

$$G = 300$$

$$NX = 20$$

$$T = 250.$$

If r increases from 0.04 to 0.05 (that is, from 4% to 5%).

- Consumption decreases by 400 (0.01) = 4.
- Planned investment decreases by 600 (0.01) = 6.

A one percentage point increase in r reduces planned spending by 10 – before the multiplier is considered.

© McGraw Hill LLC

Aggregate Expenditure

$$Y = C + I + G + NX$$

$$Y = [640 + 0.8(Y - 250) - 400r] + [250 - 600r] + 300 + 20$$

$$Y = [1{,}010 - 1{,}000r] + 0.8Y$$

$$Y = 5{,}050 - 5{,}000r$$

- In this example, a 1 percent increase in the real interest rate reduces short-run equilibrium spending and output by 50 units.
- This reduction of 50 units is 5 times larger than the initial reduction of 10 units, so the multiplier equals 5.

© McGraw Hill LLC

Real Interest Rate and Short-Run Equilibrium Output

$$Y = [1{,}010 - 1{,}000r] + 0.8Y$$

- Suppose the real interest rate is 5%, or 0.05.
- Aggregate expenditure becomes.

$$Y = [1{,}010 - 1{,}000(0.05)] + 0.8Y$$

$$0.2Y = 1{,}010 - 1{,}000(0.05)$$

$$Y = 5{,}050 - 5{,}000(0.05)$$

$$Y = \$4{,}800$$

© McGraw Hill LLC

Monetary Policy

Recessionary Gap

Expansionary Gap

© McGraw Hill LLC

The Fed's Response to 9/11

Economy began slowing in late 2000.

Terrorist attack led to contraction in travel, financial, and other industries.

The **federal funds rate** is the interest rate banks charge each other for overnight loans.

- This interest rate is the one the Fed targets when changing the money supply.

In late 2000, the fed funds rate was 6.5%.

- January 2001, the Fed cut the rate to 6.0%.
- More rate cuts followed.
- July 2001, the rate was less than 4%.

© McGraw Hill LLC

The Fed Response to 9/11

After the 9/11 attacks.

- Fed immediately worked to restore normal operation of the financial markets and institutions.
- The Fed temporarily lowered the rate to 1.25% in the week following the attack.

In the aftermath, the Fed grew concerned that consumers would decrease spending.

- Interest rate was 2.0% in November 2001.
  - 4.5 percentage points lower than a year before.

Combination of tax cuts and aggressive monetary policy helped keep the 2001 recession shallow and short.

© McGraw Hill LLC

The Fed Fights Inflation

Expansionary gap can lead to inflation.

- Demand for output exceeds the normal rate of production.
- If gap persists, prices will increase.

The Fed attempts to close expansionary gaps.

- Raise interest rates.
- Decrease consumption and planned investment.
- Decrease aggregate expenditure.
- Decrease equilibrium output.

© McGraw Hill LLC

Interest Rates Increased in 2004 and 2006

With slow recovery beginning in November 2001, the Fed continued to decrease interest rates until it reached 1.0% in June 2003.

Real GDP growth was nearly 6% in the 2nd half, 2003.

- Growth was nearly 4% in 2004.
- Unemployment was 5.6% in June 2004.

Inflation increased in 2004, mainly due to oil prices.

- Fed began tightening in June 2004.
- Fed funds rate increased from 1.0% to 1.25%.
- Continued gradually raising the fed funds rate.
- June 2006, the rate was 5.25%.

© McGraw Hill LLC

Should the Fed Respond to Changes in Asset Prices? [1]

Fed gets credit for sustained economic growth and rising asset prices in the 1990s.

- S&P 500 increased 233% between January 1995, and March 2000.
- Stocks buoyed consumption; supported growth.

Possible stock speculation led to sharp decreases.

- If the Fed had acted sooner, the run-up would have been curtailed and the crash moderated.
- Greenspan's response is.
  - Separating speculation from growth is difficult.
  - The Fed could not have timed the stock market.

© McGraw Hill LLC

Should the Fed Respond to Changes in Asset Prices? 2

The Fed has limited ability to manage the stock market.

- Fed does not know the "right" prices.
  - Information available to the Fed is publicly available.
- Monetary policy is not well suited to addressing an asset bubble (a speculative increase in asset prices over their underlying market value).
  - Fed can raise interest rates and slow the economy.
  - Could result in a recession and rising unemployment.

The debate over the Fed's role in asset prices got attention after the mortgage meltdown of 2007 – 2008.

© McGraw Hill LLC

The Fed's Policy Reaction Function

Policy reduction function describes how the action a policymaker takes depends on the state of the economy.

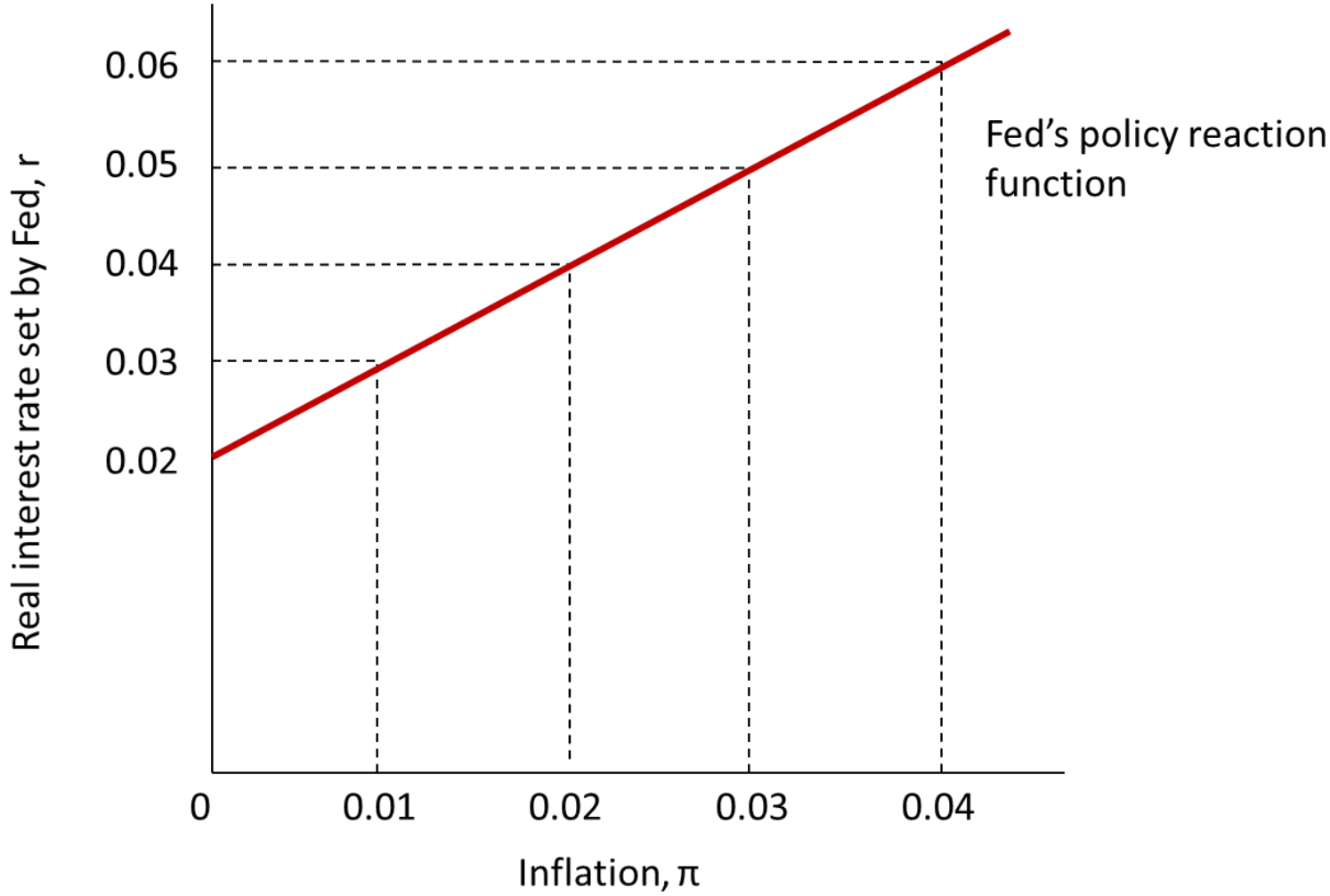
Taylor Rule:

$$r = 0.01 + 0.5\left(\frac{Y - Y^*}{Y^*}\right) + 0.5\pi$$

- r is the real interest rate set by the Fed.
- $Y - Y^*$ is the current output gap (the difference between actual output and potential output).
- $(Y - Y^*)Y^*$ is the output gap relative to potential output.
- π is the inflation rate expressed as a decimal.

© McGraw Hill LLC

An Example of a Fed Policy Reaction Function



Access the text alternative for slide images.

© McGraw Hill LLC

Policymaking: Art or Science?

Macroeconomic policy works best with.

- Accurate knowledge of current economic conditions.
- Knowledge of the future path of the economy without policy.
- Precise value of potential output.
- Good control of fiscal and monetary policies.
- Knowledge of how and when the economy will respond to policy changes.

© McGraw Hill LLC

Because learning changes everything.®

www.mheducation.com

Copyright 2022 © McGraw Hill LLC. All rights reserved. No reproduction or distribution without the prior written consent of McGraw Hill LLC.